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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/934,175	08/21/2001	Robert L. Canella	4323US (MUEI-0543.00/US)	7405

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EXAMINER	
KIELIN, ERIK J	

ART UNIT	PAPER NUMBER
2813	

DATE MAILED: 05/11/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	09/934,175	CANELLA, ROBERT L.	
	Examiner	Art Unit	
	Erik Kielin	2813	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *14 February 2005*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *9-18,20-23 and 42-50* is/are pending in the application.

4a) Of the above claim(s) *42-50* is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *9-18 and 20-23* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *14 February 2005* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date *11/15/04 3/17/05*.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

DETAILED ACTION

Continued Examination Under 37 CFR 1.114

1. A request for continued examination under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed in this application after final rejection. Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, the finality of the previous Office action has been withdrawn pursuant to 37 CFR 1.114. Applicant's submission filed on 17 February 2005 has been entered.

Claim Rejections - 35 USC § 112

2. The following is a quotation of the second paragraph of 35 U.S.C. 112:

> The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

3. Claims 9-18 and 20-23 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

As amended, claim 9 recites the limitation, "wherein **an** area of the substantially uniform diameter of the retaining portion is smaller than **an** area of the opening of the seat portion at the surface of the one-piece substrate." (Emphasis added.) This limitation is unclear because it is unclear as to what "area" is being referred. If Applicant is referring to the area of the respective openings, it should be referred to as "the area of the..." for each rather than "an area of the..." because the area of some opening is an intrinsic character of the opening. The use of "an area of the..." leaves the "area" which is being referred to, open for speculation (i.e. is indefinite).

Claim Rejections - 35 USC § 103

4. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

5. Claims **9** and 20-22 are rejected under 35 U.S.C. 103(a) as being unpatentable over US 6,229,320 B1 (Haseyama et al., **Haseyama-1**, hereafter) in view of **JP 10-293156**.

Regarding claim 9, **Haseyama-1** discloses a device for establishing electrical contact between a lead element **28** (called "solder bumps" col. 10, Fig. 15) extending from an integrated circuit **25** (called "IC" col. 10, line 31) comprising,

a one-piece substrate **31** (Fig. 7), **31A** (Fig. 14B), **31A**, **41**, **42** (Figs. 15-16) bounded by a first surface and an opposing, second surface and having at least one conductive trace **48** (Fig. 16), wherein the first surface is configured for mounting an IC devices (called "semiconductor devices" in Haseyama at col. 1, lines 18-27) thereto, and wherein the conductive trace **48** is configured for operably connecting the IC device **25** to at least one electrical component (e.g. **47**, Fig. 16) mounted on the one-piece substrate;

a spring contact (Figs. 21A-21B, 23A) including a generally uncoiled base portion **71, 72, 73** (Figs. 24A-24C) and a contact portion **63** longitudinally adjacent thereto, the contact portion **63** comprising a resiliently compressible coil spring **63** comprising a plurality of coils (Fig. 22B, for example) configured to bias against and electrically contact a lead element **28** of an IC device **25** of the plurality of IC devices, and the generally uncoiled base portion extending generally

longitudinally away from the contact portion and transversely to the coils of the coil spring (col. 15, lines 32-53; col. 16, lines 17-25); and

an aperture **43**, **44** including:

a seat portion **53A** (Fig. 14B called a "bump positioning part" col. 11, last paragraph or "positioning holes" col. 12, line 15) forming an opening onto the first surface of the one-piece substrate **31A, 41, 42** and sized and configured to at least partially contain the contact portion **63** of the spring contact **63** and longitudinally support the coils of the coil spring during compression thereof (Figs. 9, 13B, 14B); and

a retaining portion **46, 70** (Figs. 16, 24A-24C) having a substantially uniform interior diameter and a first end connected to an opposing end of the seat portion **53A** (Fig. 14B) and a second end **46, 70** extending at least partially into the one-piece substrate, **31A**, **41**, **42**, wherein an area of the substantially uniform interior diameter of the retaining portion is smaller than an area of the interior opening of the seat portion at the first surface of the one-piece substrate, and wherein the retaining portion is configured to receive and electrically connect (by item **46** in Fig. 16, called "through hole electrodes," at col. 12, lines 45-47; or item **70** in Figs. 24A-24C) the generally uncoiled base portion **71, 72, 73** of the spring contact **63**, to the at least one conductive trace **48** (Fig. 16).

Note, the compressed coil springs are supported by the seat portion ("bump positioning part") of the aperture because the contact pins of **Haseyama** are shown as that in Figs. 21A through 22B and fit into the openings shown in Figs. 9, 13B, and 14B.

If it is thought that **Haseyama-1** does not provide a "one-piece substrate" since the items **31A**, **41** and **42 --in one embodiment--** are labeled differently, then this may be a difference. However, it has been held that the use of a one-piece construction instead of the separate pieces, would be merely a matter of obvious engineering choice. See *In re Larson*, 340 F.2d 965, 968, 144 USPQ 347, 349 (CCPA 1965) (A claim to a fluid transporting vehicle was rejected as obvious over a prior art reference which differed from the prior art in claiming a brake drum integral with a clamping means, whereas the brake disc and clamp of the prior art comprise several parts rigidly secured together as a single unit. The court affirmed the rejection holding, among other reasons, "that the use of a one piece construction instead of the structure disclosed in [the prior art] would be merely a matter of obvious engineering choice.") In the instant case, it would be obvious to form the **Haseyama-1** substrate **31A, 41, 42** integrally, because the parts of the substrate are shown in direct contact with each other in, for example, the **Haseyama-1** Fig. 9. Moreover, Fig. 14B shows that the seat portion and retaining portion of the aperture are integrally formed. Fig. 15 shows that the items **31A**, **41**, and **42** form a "one-piece substrate."

Haseyama-1 does not indicate that the one-piece substrate is configured for a plurality of IC packages.

JP 10-293156 teaches a method of testing a plurality of IC packages attached to a semiconductor device testing assembly (Figs. 1-4) stating that testing efficiency is improved thereby.

It would have been obvious for one of ordinary skill in the art, at the time of the invention to configure the substrate of **Haseyama-1** to test plural IC packages simultaneously, to improve testing efficiency as taught by **JP 10-293156**.

Regarding claim 20, **Haseyama-1** the second end of the retaining portion **46**, **70**, opens onto an opposing surface of the substrate **42**, **32** as shown in Figs. 16, 24A-24C.

Regarding claim 21, **Haseyama-1** the seat portion may be conically shaped (Fig. 11), hemispherically shaped (Fig. 9) or cylindrically shaped (Fig. 14B).

Regarding claim 22, **Haseyama-1** the seat portion **38** (or **53A**) is configured to at least partially align the lead element **28** of the IC device **25**, as noted above.

6. Claims 11-14 are rejected under 35 U.S.C. 103(a) as being unpatentable over **Haseyama-1** in view of **JP 10-293156** as applied to claim 9 above, and further in view of US Patent Application Publication US 2002/0075025 A1 (**Tanaka**).

The prior art of **Haseyama-1** in view of **JP 10-293156**, as explained above, discloses each of the claimed features except that **Haseyama-1** does not indicate that the one-piece substrate **31** has a layer of conductive material or a volume of conductive filler disposed on the interior wall of the aperture connecting the generally uncoiled base portion of the spring to the conductive trace **48**.

Tanaka, like **Haseyama-1**, teaches a semiconductor testing tool (Abstract; Fig. 4), and provides a one-piece, multi-layered substrate **3**, having a conductive layer or filler **7** formed on the interior walls of the aperture **3a** used to electrically connect a spring contact **9** within the aperture **3a** to conductive traces formed on (1) the first surface (i.e. the same surface at which the IC package is mounted; taken to be the portion of **7** on top surface) --as further limited by instant claim 12-- (2) the second, opposing surface (portion of **7** on bottom surface) and (3) the intermediate conductive plane **8** (called "internal lead wires **8**" in the Abstract of Tanaka) --as

further limited by instant claim 13-- electrically connected to the conductive layer or filler **7**, which beneficially reduces the number of structural elements of the test tool and also gives the shortest signal path to improve the speed of testing the IC package (Tanaka, paragraph [0029]).

It would have been obvious for one of ordinary skill in the art, at the time of the invention to include the conductive filler on the interior wall of the aperture and the electrically-connected-thereto conductive traces on the top and interior of the one-piece substrate of **Haseyama-1** to beneficially reduce the number of structural elements, shorten the electrical path, and thereby increase testing speed, as taught by **Tanaka**.

Further regarding claim 14, **Haseyama-1** also discloses that the conductive traces **48** are formed on the opposing surface of the one-piece substrate (Fig. 16).

7. Claim 23 is rejected under 35 U.S.C. 103(a) as being unpatentable over **Haseyama-1** in view of **JP 10-293156** as applied to claim 9 above, and further in view of JP 2000-123935 **(Kawaguchi)**.

The prior art of **Haseyama-1** in view of **JP 10-293156**, as explained above, discloses each of the claimed features except that **Haseyama-1** does not indicate that the coil spring has at least two coils for contacting the lead elements.

Kawaguchi teaches a similar integrated circuit test tool to **Haseyama-1** wherein coil springs **20** (Figs 1 and 2) are used to make electrical contact to the lead elements **11** (solder bumps or conductive balls) of an integrated circuit **10**, and states in pertinent part (in the machine language translation) "this invention aims at offer of the contact pin which does not start the defective continuity by the poor contact, and the socket using this contact pin, without generating

damage, when ... a conductive ball is contacted" (paragraph [0006]) and in solving the problem provides a contact pin having a contact section, "of the shape of a spiral by two or more number-of-turns sections of a coiled spring edge." The figures show that at least two coils each contact the ball.

It would have been obvious for one of ordinary skill in the art, at the time of the invention to use two or more coil turns as taught by **Kawaguchi** in the spring contact portion of **Haseyama-1** to prevent damage and provide better contact with the solder bumps, as expressly taught by **Kawaguchi**.

Allowable Subject Matter

8. The following is a statement of reasons for the indication of allowable subject matter, pending the overcoming of the rejection of the claims over 35 USC 112(2):

Regarding claim 10, given the configuration of the substrate in **Haseyama-1**, it would not be obvious to limit the extent of the retaining portion such that it does not extend all of the way through the substrate, as this would prevent connection to the test board. In the context of the instantly claimed invention, this feature is not considered obvious over the prior art of record.

Regarding claim 15, while **Haseyama-2** discloses item **25** in Fig. 5B, shown to be a volume of conductive filler material disposed in and filling at least a portion of a longitudinal extent of the aperture **21** and contacting the base portion of the spring contact, **the base portion does not extend into the conductive filler**.

Claims 16-18 depend from claim 15 and contain all of the limitations of claim 15.

Response to Arguments

9. Applicant's arguments filed 17 February 2005 have been fully considered but they are not persuasive.

The rejection over Haseyama-2 in view of APA has been withdrawn because of the amendment to the nature of the aperture, wherein the relative areas of the diameters of the seat and retaining portions.

Applicant's arguments regarding anticipation of the claim over Haseyama-1 (US 6,229,320 B1) are noted. The arguments are moot in view of new grounds of rejection. While neither conceding nor agreeing that the test board 32 is not part of the one-piece substrate, the present rejection no longer requires 32 to be part of the one-piece substrate. Accordingly, the arguments in this regard are moot.

Conclusion

10. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

US Patent Application Publication 2002/0027445 A1 (**Sausen**) discloses a one-piece substrate for testing plural IC packages (Fig. 4).

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Erik Kielin whose telephone number is 571-272-1693. The examiner can normally be reached from 9:00 - 19:30.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Carl Whitehead, Jr. can be reached on 571-272-1702.. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Erik Kielin
Primary Examiner
May 9, 2005